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**A Comparison of the Past and Present
Freshwater Mussel Fauna of the Kankakee River in Illinois**
RANDALL B. LEWIS AND JAMES R. BRICE*

ABSTRACT

The freshwater mussels of the Kankakee River were surveyed at five locations in Illinois during 1976 and 1978. A total of 20 species were collected in this study compared to 22 species from the same sites in 1909. *Actinonaias carinata*, the "mucket", was the dominant species observed at most sampling locations during 1976 and 1978. Although the diversity and relative abundance of the freshwater mussels have declined slightly since 1909, the fauna of the lower Kankakee River has not changed drastically during this time period. The introduced Asiatic clam, *Corbicula fluminea*, which recently entered the Illinois River basin, was also recorded in the present survey.

INTRODUCTION

The Kankakee River, or the Theakiki as it was known by early French explorers, is a geologically young river that commenced its present existence after the retreat of the glaciers. It drains a portion of northwestern Indiana before entering Illinois, where it flows westerly and unites with the Des Plaines River forming the Illinois River.

A freshwater mussel survey of the upper Illinois River in the early 1870's by Calkins (1874) revealed a diverse and abundant mussel fauna to be present. Completion of the Chicago Sanitary and Ship Canal (CS&SC) in 1900 eventually subjected the lower Des Plaines River and subsequently the upper Illinois River to the adverse impacts of pollution from the Chicago area (Starrett 1971).

*Ecological Analysts, Inc., 1500 Frontage Road, Northbrook, Ill. 60062.

A few years later, Forbes and Richardson (1913) reported that the once rich mussel fauna of the upper Illinois River was almost totally extirpated, apparently due to the polluted waters of the CS&SC.

Wilson and Clark (1912) described the Des Plaines River at its junction with the Kankakee River in 1909 as "an immense sewer bringing down the Chicago drainage." They were unable to locate a single live mussel at the confluence of these rivers in their survey of the Kankakee River basin. Although the biota at the mouth of the Kankakee River was influenced by the opening of the CS&SC, further upstream the survey revealed a healthy mussel community.

Due to local industrial, domestic and agricultural pollution resulting from increased growth and development in the Kankakee River watershed, this river could be expected to suffer the same fate as the Illinois River. However, there have been no recent, documented investigations of the river in this regard. This study was undertaken to determine the present species composition and relative abundance of the mussel fauna in the lower Kankakee River, and to compare these results with extant historical data in order to ascertain changes in the mussel fauna of this river after the passage of over a half century.

METHODS AND MATERIALS

Five sites on the Kankakee River in northeastern Illinois were sampled for freshwater mussels during 1976 and 1978 (Figure 1). These sampling locations were situated in approximately the same reaches in the Illinois portion of the Kankakee River which were sampled during the 1909 survey by Wilson and Clark (1912). Sampling was conducted at Locations 1 and 2 during 1978, and at Locations 3, 4, and 5 during 1976. Locations 1 through 4 were in similar lotic habitats with rocky substrates and constant current, while Location 5 was in a lentic habitat situated in the silty pool of Dresden Island Dam on the Illinois River.

All locations were surveyed utilizing qualitative techniques including a 4-foot long brail (crowfoot bar) with 44 hooks, a mussel rake and hand collecting. In addition, the mussel community at Location 3 was sampled by a diver utilizing SCUBA equipment. Relic mussel shells (these shells of non-living identifiable specimens) collected along the shoreline and in muskrat middens were also reported in these investigations. The 1909 survey by Wilson and Clark had also included relic mussel species, but usually no distinctions were made between live and dead specimens collected.

A list was made of the live and relic mussel species collected at each location and the presence or absence of juvenile mussels was also noted. The species composition and relative abundance of the mussels collected during 1976 and 1978 were then compared to the 1909 survey data.

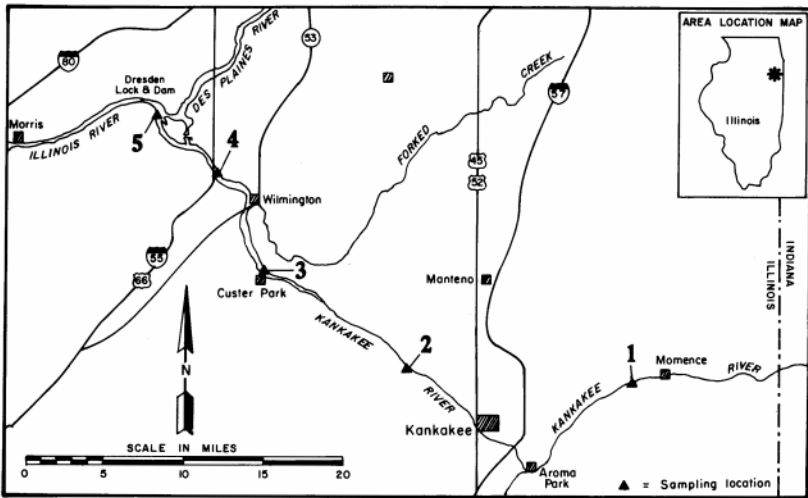


Figure 1. Freshwater mussel sampling locations along the Kankakee River in Illinois during 1909, and 1976 and 1978.

RESULTS AND DISCUSSION

The 1976 and 1978 surveys of the lower Kankakee River mussel fauna resulted in the collection of 20 mussel species (Table 1). By comparison 22 species were collected at the same sites during 1909 by Wilson and Clark (1912). *Obovaria olivaria*, the "hickory-nut"; *Proptera alata*, the "pink heel-splitter"; and *Villosa iris*, the "rainbow-shell", were the only species collected in 1909 that were not collected in 1976 or 1978. However, the 1909 data indicated that these three species were rare in the lower Kankakee River at that time. In addition, these mussels apparently have been eliminated from the upper Illinois River due to increased pollution, siltation or damming of the river (Starrett 1971). Therefore, the absence of these three species in the recent surveys of the Kankakee River may have been due either to their natural sporadic occurrence or perhaps a pollution-induced population decline.

Anodonta imbecillis, the "paper pond shell", was the only species collected in the 1976 and 1978 surveys which was not also recorded at the same Illinois sites in 1909. However, Wilson and Clark reported that this species was commonly observed in the Indiana portion of the Kankakee River in 1909.

Fusconaia flava, the "pig-toe", and *Plethobasus cyphus*, the "bullhead", were collected live in 1909 but only relic specimens were recorded in 1976 and 1978. The numerous relic specimens of *Fusconaia flava* collected in 1976 and 1978 indicates this species is probably still present in the Kankakee River. The rare occurrence

Table 1. Freshwater mussel fauna of the Kankakee River during 1909, and 1976 and 1978.

Scientific Name	Common Name	1909 ^a	1976 & 1978
Amblemidae			
<i>Amblema costata</i>	Three-Ridge	X ^b	X
<i>Fusconaia flava</i>	Wabash Pig-Toe	X	X (dead)
<i>Quadrula metanevra</i>	Monkey-Face	X	X
<i>Quadrula pustulosa</i>	Pimple-Back	X	X
<i>Quadrula quadrula</i>	Maple-Leaf	X	X
Unionidae			
<i>Actinonaias carinata</i>	Mucket	X	X
<i>Actinonaias ellipsiformis</i>	Ellipse	X	X
<i>Alasmidonta marginata</i>	Elk-Toe	X	X
<i>Anodonta grandis</i>	Floater	X (dead)	X
<i>Anodonta imbecillis</i>	Paper Pond Shell	—	X
<i>Cyclonaias tuberculata</i>	Purple Warty-Back	X	X
<i>Elliptio dilatatus</i>	Spike	X	X
<i>Lasmigona complanata</i>	White Heel-Splitter	X	X
<i>Lasmigona costata</i>	Fluted Shell	X	X
<i>Lampsilis siliquioidea</i>	Fat Mucket	X	X
<i>Lampsilis ventricosa</i>	Pocketbook	X	X
<i>Ligumia recta</i>	Black Sand-Shell	X	X
<i>Obovaria olivaria</i>	Hickory-Nut	X	—
<i>Plethobasus cyphus</i>	Bullhead	X	X (dead)
<i>Pleurobema cordatum</i>			
<i>coccineum</i>	Ohio River Pig-Toe	X	X
<i>Proptera alata</i>	Pink Heel-Splitter	X	—
<i>Strophitus undulatus</i>	Squaw Foot	X	X
<i>Villosa iris</i>	Rainbow-Shell	X	—
Total Species		22	20

^aWilson and Clark 1912.

^bX indicates mussel was present; dash (—) indicates mussel was absent. of *Plethobasus cyphus* in the Kankakee River during 1909 (Wilson and Clark 1912) and in all other streams of Illinois (Parmalee 1967) was the probable reason no live specimens of this species were collected in 1976 and 1978.

Fourteen live species and three relic species were collected at Location 1 near Momence, Illinois, in 1978, whereas 18 species were found in 1909 (Table 2). *Lampsilis siliquioidea*, the "fat mucket"; *Quadrula pustulosa*, the "pimpleback"; and *Actinonaias carinata*, the "mucket", in order of decreasing abundance, were the most

Table 2. Freshwater mussel fauna at various locations in the Kankakee River during 1909, and 1976 and 1978.

Species	Loc. 1		Loc. 2		Loc. 3		Loc. 4		Loc. 5	
	1909	1978	1909	1978	1909	1976	1909	1976	1909	1976
Amblemidae										
<i>Amblema costata</i>	X ^a	—	X	X	X	X	X	X	—	—
<i>Fusconaia flava</i>	X	[X]	X	[X]	X	[X]	X	—	—	—
<i>Quadrula metanera</i>	X	X	X	X	X	X	—	[X]	[X]	—
<i>Quadrula pustulosa</i>	X	X	X	—	X	X	X	X	—	—
<i>Quadrula quadrula</i>	—	—	X	—	X	X	—	—	—	—
Unionidae										
<i>Actinonaias carinata</i>	X	X	X	X	X	X	X	X	[X]	—
<i>Actinonaias ellipsiformis</i>	X	X	—	X	—	—	X	X	—	—
<i>Alasmidonta marginata</i>	X	X	—	—	X	X	X	X	—	—
<i>Anodonta grandis</i>	—	X	—	—	—	—	—	—	[X]	—
<i>Anodonta imbecillis</i>	—	X	—	—	—	—	—	—	—	—
<i>Cyclonaias tuberculata</i>	X	X	X	[X]	X	X	X	[X]	[X]	—
<i>Elliptio dilatatus</i>	X	X	X	X	X	X	X	X	—	—
<i>Lasniogona complanata</i>	X	X	X	X	X	X	X	X	—	—
<i>Lasniogona costata</i>	X	[X]	X	X	X	X	X	X	—	—
<i>Lampsilis siliquoides</i>	X	X	X	X	—	X	X	X	X	[X]
<i>Lampsilis ventricosa</i>	X	X	X	[X]	X	X	X	—	—	—
<i>Ligumia recta</i>	X	X	X	[X]	X	X	X	X	—	—
<i>Obovaria olivaria</i>	X	—	X	—	X	—	—	—	—	—
<i>Pleurobasus cyphus</i>	X	—	—	[X]	—	—	—	—	—	—
<i>Pleurobema cordatum coccineum</i>	X	[X]	—	X	—	X	X	X	—	—
<i>Proptera alata</i>	—	—	—	—	X	—	—	—	—	—
<i>Strophitus undulatus</i>	X	X	—	X	X	X	X	—	—	—
<i>Villosa iris</i>	—	—	—	—	X	—	—	—	—	—
Total Species	18	17	14	13	18	16	14	12	5	0

^a X indicates live mussel was collected; [X] indicates a relic mussel was collected; dash (—) indicates mussel was not collected.

frequently collected mussels at this location in 1978. *Actinonaias carinata* was recorded as the most commonly occurring species at this location in 1909.

The 1978 survey at Location 2, downstream from Kankakee, Illinois, resulted in the collection of eight live and five relic species. Fourteen species were collected at this location in 1909. *Actinonaias carinata*, which prefers a coarse sand and gravel substrate (Parmalee 1967), was the most frequently collected species in 1978. However, the entire mussel community was sparse at this rocky riffle habitat.

Sixteen mussel species were collected at Location 3 during 1976, while 18 species were found in 1909. *Actinonaias carinata*, which was the dominant species in both 1909 and 1976, was commonly collected from gravel pockets situated between the large rocks in this fast-flowing riffle. Wilson and Clark also noted this unique habitat in 1909. This location had the greatest mussel densities of all locations sampled during the present survey.

Sampling at Location 4 resulted in the collection of 12 mussel species in 1976 compared to 14 species in 1909. The mussel community at Location 4 was similar to Location 2 in that *Actinonaias carinata* was dominant and the mussel occurrence was sporadic.

No live mussel specimens were collected at Location 5 in either 1976 or 1909. The pollution from the Des Plaines River, which had destroyed the mussel fauna at this location by 1909, has apparently prevented the recolonization of the area. The Des Plaines River water did not directly influence any other Kankakee River sampling sites.

Juvenile mussels were noticeably sparse at all locations in 1976 and 1978. Notation of juvenile presence/absence data is important in that it can provide insight concerning a species' reproductive capability (Fuller 1978). The scarcity of immature mussels in the present survey indicated that juveniles are either uncommon in the Kankakee River or they occupy a habitat in the river which was not sampled in 1976 and 1978.

A special note should be made of the occurrence of live *Cyclonaias tuberculata* at Locations 1 and 3. This species has been reported to be extirpated from the Illinois River (Starrett 1971) and probably extinct in the upper Mississippi River (Fuller 1978). The Kankakee River may contain one of the few remaining populations of this species in Illinois.

The Asiatic clam, *Corbicula fluminea*, was commonly collected at Location 3 in the Kankakee River during 1976. This species was recently introduced into North America and was not present at the time of Wilson and Clark's survey of the Kankakee River. The discovery of *Corbicula* in the Kankakee revealed an upstream range extension of this species from a 1975 collection in the Illinois River near Morris, Illinois (Thompson and Sparks 1977).

The occurrence of this warmwater species in the Kankakee River was considered unusual, as many northern range extensions of

Corbicula in the Mississippi River basin have been associated with heated discharge (Eckblad 1975, Cummings and Jones 1978). This species apparently thrives in warm water habitats; however, the *Corbicula* at the Kankakee River collection site had no associated heated effluent.

The diversity and relative abundance of the mussel fauna in the lower Kankakee was found to have changed only slightly from 1909 to 1976 and 1978. Water pollution from the Chicago Sanitary and Ship Canal which had such deleterious effects upon the mussel populations of the Des Plaines and Illinois rivers, has apparently influenced only the mussel fauna at the mouth of the Kankakee River.

These data suggest that domestic, industrial or agricultural development along the Kankakee River has not drastically altered the water quality of the river since the earlier sampling in 1909. However, the current scarcity of juvenile mussels and lesser abundance of certain adults indicates that subtle changes in the aquatic ecosystem may have occurred over this span of time. The existence of this abundant mussel fauna near the metropolitan Chicago area is uncommon and this unique community should be preserved to avoid a fate similar to that of the mussels of the Des Plaines and Illinois rivers.

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